REMARKS

In the aforementioned Office Action, claims 1-25 were examined. Claims 16-19 and 21-25 were subject to restriction and/or election requirement, claims 1-15 and 20 were rejected, and the Examiner objected to claims 4, 8, and 15. In view of the following remarks, Applicants respectfully request reconsideration of the application. Applicants have added claims 26-32.

Election/Restrictions

On page 2 of the Office Action, claims 16-19 and 21-25 (group II) stand subject to withdrawal under 35 U.S.C. 121 as being distinct from claims 1-15 and 20 (group I). Examiner asserts that "the combination as claimed does not require the particulars of the subcombination as claimed because the combination does not require estimate transaction location or logical volume management. The subcombination has separate utility such as identifying a transaction associated with estimated transaction location or managing data using logical volume. Applicants elect to amend the claim to place the claim in proper dependent form." Examiner further asserts on page 3 of the office action that "these inventions are independent or distinct for the reasons given above and have acquired a separate status in the art in view of their different classification".

During a telephone conversation with Applicants' representative, the Examiner claims that a provisional election was made without traverse to prosecute the invention of Group I, claims 1-15 and 20. This is incorrect. Applicants note that the election was not made without traverse. Applicants affirm this election, with traverse, and cancel claims 16-19 and 21-25.

The Examiner objects to the title of the invention. The Examiner asserts that the title is not descriptive. Applicants amend the title to be clearly indicative of the invention to which the claims are directed.

On page 4 of the office action, claim 13 stands objected to under 37 CFR 1.75(c). Examiner asserts that claim 13 is "of improper dependent form for failing to further limit the subject matter of a previous claim." Applicants amend the claim.

On page 4 of the office action, claims 4, 8, and 15 are objected to because of informalities.

On page 4 of the office action, Examiner asserts that claim 4 recites "the association" at line 3 and that there is insufficient antecedent basis for this limitation in the claim. Applicants amend claim 4 to read in pertinent part, "an association" at line 3.

On page 4 of the office action, Examiner asserts that claim 8 recites the limitation "the plurality of data" in line 3. Examiner further asserts that, "There is insufficient antecedent basis for this limitation in the claim. For purposes of the examination, the Examiner presume [sic] the limitation should read "the plurality of the data **writes**" as recited in independent claim 1." Applicants amend claim 8 to read in pertinent part, "the plurality of data writes" in line 3.

On page 4 of the office action, Examiner asserts that claim 15 recites "said updating the backup storage system so that the data on the data storage system at the **first time** is the same as the data on the backup storage system at the **first time**". Examiner further asserts at pages 4-5 of the office action that, "There is insufficient antecedent basis for this limitation in the claim. For purposes of

examination, the Examiner presumes the limitation should read: "said updating the backup storage system so that the data on the data storage system at the **second time** is the same as the data on the backup storage system at the **second time**" as recited in claim 14. Applicants amend claim 15 to read in pertinent part "said updating the backup storage system so that the data on the data storage system at the **second time** is the same as the data on the backup storage system at the **second time**".

Claim Rejections - 35 USC § 102

On page 5 of the office action, claims 1-15 and 20 stand rejected under 35 U.S.C. 102(e) as being anticipated by Goldstein et al. (US 6,665,815) hereinafter "Goldstein".

With regard to claim 1, Examiner asserts on pages 5-6 of the office action that "Goldstein teaches a method for maintaining a backup storage system for a data storage system comprising:

"receiving a plurality of data writes from an application program, the plurality of data writes occurring between a first time and a second time" at col. 5 lines 44-49 and Fig. 3; [and]

"Determining a backward increment between data on the data storage system the second time and data on the data storage system at the first time based on the plurality of data writes from the application program to the data storage system" at Col. 6 lines 6-60 and Fig. 7;" Applicants respectfully traverse.

A careful review of Goldstein reveals that Goldstein takes two snapshots of a disk volume at two different times. The two snapshots are virtual copies of the disk volume at those two different times, <u>not a plurality of data writes</u> from an application program occurring <u>between</u> a first time and a second time (see col. 3, lines 33-46). Goldstein compares the two snapshots to determine a difference list, based on the difference between the two snapshots (see col. 4, lines 11-18).

Even if "the backward increment" could be determined from the difference list, Goldstein could only determine a "backward increment" based on the difference between the two snapshots, <u>not based on a plurality of data writes</u> from an application program to the data storage system.

Goldstein fails to teach or suggest "receiving a plurality of data writes from an application program" as asserted by the Examiner. Goldstein, instead, takes a snapshot of a disk volume at various times that correspond to data volume states (see col. 4, lines 1-10). "[A] snapshot is a virtual copy of a disk volume." Col. 3 lines 43-44 and FIG. 2. The snapshots capture the state of the volume, not data writes from an application program. Thus, snapshots are made only when the system is in a "consistent state". Col. 3, lines 56-67 and FIG. 3. A snapshot of a disk is static capture of the entire contents of a volume at a single point in time, <u>not a "plurality of data writes from an application program to the data storage system."</u>

Goldstein takes a snapshot at time t_0. "A data volume base state 101 is defined as the state of the data volume at a baseline time t_0. A base state snapshot 111 (S_0) is made of the data volume base state 101." Col. 3 lines 60-63. Goldstein then takes a snapshot at time t_1. "A first state snapshot 113 (S_1) is made of the first data volume consistent state 103." Col. 4 lines 1-2. It appears that a 'consistent state', as taught by Goldstein, is a period when system operation is suspended ("Once the snapshot has been taken, system operation can continue while the backup is taken of the snapshot." Col 3 lines 47-48). Therefore, a snapshot of a disk that is made when the disk is in a 'consistent state' <u>is not</u> 'a <u>plurality of data writes</u> from an application program, the plurality of data writes occurring between a first time and a second time."

Goldstein bases a 'snapshot difference list' on the difference between the state of the disk at the base time and the state of the disk at the first time, <u>not</u>, as

asserted by the Examiner, "based on the plurality of data writes from the application program to the data storage system." At Col. 4 lines 13-18 Goldstein describes obtaining a 'difference list'. "A first succedent snapshot difference list 121 (S_{01}) in data volume state snapshots is then obtained. A 'snapshot difference list' (e.g., $S_0 - >S_1$) is a list of identifiers of those data blocks in the first state snapshot 113 (S_1) that differ from the data blocks in the base state snapshot 111 (S_0)." See also Col. 4 lines 28-36.

Goldstein fails to teach or suggest that the "difference list" may be used to determine the "backward increment" of claim 1, but even if Goldstein did use the "difference list" for determining the "backward increment" of claim 1, Goldstein could only determine such "backward increment" based on the difference between the snapshot of the disk in the base state and the snapshot of the disk in the first state not, as asserted by the Examiner, "based on the plurality of data writes from the application program to the data storage system." Thus, respectfully, Goldstein clearly fails to teach or suggest the subject matter set forth in claim 1 or any other subject matter taught by the present application.

For at least these reasons, Applicants respectfully submit that Goldstein does not anticipate claim 1. Because claims 2-15 depend directly or indirectly from claim 1, these claims are not anticipated for at least the same reasons as the reasons discussed in association with claim 1.

With regard to claim 20, Examiner asserts on pages 9-10 of the office action that "Goldstein teaches a method for using a backup storage system for a data storage system comprising:

"receiving a plurality of data writes captured between an application and the data storage system, the plurality of data writes occurring between a first time and a second time" at Col. 5 lines 44-48 and Fig. 3;

"identifying data blocks in the data storage system that were changed based on the plurality of data writes" at Col 5 lines 23-48;

"applying the plurality of data writes to an image on the backup storage system" at Col. 6 lines 6-31;

"determining a forward increment between data on the data storage system at the first time and data on the data storage system at the second time based on the plurality of data writes" at Col. 3 line 55 to Col. 4 line 50 and Figs. 4,6; [and]

"determining a backward increment between data on the data storage system at the second time and data on the data storage system at the first time based on a plurality of data writes" at Col. 6 lines 6-31 and Figs. 7-11;" Applicants respectfully traverse.

A careful review of Goldstein reveals that Goldstein takes two snapshots of a disk volume at two different times. The two snapshots are virtual copies of the disk volume at those two different times, not a plurality of data writes captured between an application and the data storage system, and occurring between a first time and a second time. Goldstein compares the two snapshots to determine a difference list, based on the difference between the two snapshots Goldstein identifies data blocks in the storage system that were changed based on the difference between the two snapshots, <u>not based on the plurality of data writes</u>. Assuming that "the forward increment" may be determined from the difference list the, Goldstein determines a "forward increment" based on the difference between the two snapshots, not based on the plurality of data writes. Assuming that "the backward increment" may be determined from the difference list the, Goldstein determines a "backward increment" based on the difference between the two snapshots, not based on the plurality of data writes.

Goldstein never "receives a plurality of data writes captured between an application program and the data storage system" as asserted by the Examiner. Goldstein takes a snapshot of a disk volume at a base time and another snapshot of the disk volume at a first time. "[A] snapshot is a virtual copy of a disk volume." Col. 3 lines 43-44 and FIG. 2. The snapshots capture the state of the volume, not data writes from an application program. That is, snapshots are made only when the system is in a "consistent state". Col. 3, lines 56-67 and FIG. 3. A snapshot of a disk is static capture of the entire contents of a volume at a single point in time, instead of a "plurality of data writes from an application program to the data storage system".

Goldstein never receives a plurality of data writes occurring between a first time (t_0) and a second time (t_1).

Goldstein takes a snapshot at time t_0. "A data volume base state 101 is defined as the state of the data volume at a baseline time t_0. A base state snapshot 111 (S_0) is made of the data volume base state 101." Col. 3 lines 60-63

Goldstein takes a snapshot at time t_1. "A first state snapshot 113 (S_1) is made of the first data volume consistent state 103." Col. 4 lines 1-2.

It can be inferred from Goldstein that a 'consistent state' is a period when system operation is suspended. "Once the snapshot has been taken, system operation can continue while the backup is taken of the snapshot." Col 3 lines 47-48.

A snapshot of a disk that is made when the disk is in a 'consistent state' is not "a plurality of data writes from an application program, the plurality of data writes occurring between a first time and a second time".

Goldstein bases a 'snapshot difference list' on the difference between the state of the disk at the base time and the state of the disk at the second time not, as asserted by the Examiner, "based on the plurality of data writes from the

application program to the data storage system". At Col. 4 lines 13-18 Goldstein describes obtaining a 'difference list'. A first succedent snapshot difference list 121 (S_{01}) in data volume state snapshots is then obtained. A 'snapshot difference list' (e.g., $S_0 \rightarrow S_1$) is a list of identifiers of those data blocks in the first state snapshot 113 (S_1) that differ from the data blocks in the base state snapshot 111 (S_0)." See also Col. 4 lines 28-36.

Goldstein identifies the data blocks in the data storage system that were changed based on the difference list not, as asserted by the Examiner, "based on the plurality of data writes". "The first succedent snapshot difference list 121 thus includes identifiers of all the data blocks of the first state snapshot 113 differing from data blocks in the base snapshot 111." Col. 4 lines 28-31.

Goldstein applies the difference list to an image on the backup storage system not, as the Examiner asserts, "the plurality of data writes". "A first succedent backup 131 (B_{01}) is created by copying from the first state snapshot 113 (S_1) all the data blocks identified in the first succedent snapshot difference list 121. A copy of the snapshot difference list 121 is also included in the first succedent backup 131." Col. 4 lines 36-40.

Assuming for the sake of argument that the "difference list" may be used to determine the "forward increment" of claim 20, Goldstein would determine such "forward increment" based on the difference between the snapshot of the disk in the base state and the snapshot of the disk in the first state rather than "based on the plurality of data writes".

For at least these reasons, Applicants respectfully submit that Goldstein does not anticipate claim 20.

Claims 2-15 are dependent upon claim 1 and should be allowed for at least the reasons discussed herein with respect to claim 1. The Examiner is therefore,

respectfully, requested to withdraw the rejection of Applicants' claims under 35 U.S.C. § 102(e).

New claims 26-32 have been added. No new matter is introduced by the addition of these claims. These claims should be allowable for at least the same reasons as claim 1-15.

Conclusion

Based on the above remarks, Applicants believe that the rejections and objections in the Office Action of February 16, 2006 are fully overcome, and respectfully submits that the application is in condition for allowance. If the Examiner has questions regarding the case, the Examiner is invited to contact Applicants' undersigned representative at the number given below.

Respectfully submitted,

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